

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

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(PCT Article 36 and Rule 70)

Applicant's or agent's file reference bom0201pc		FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/DK2003/000427	International filing date (day/month/year) 23-06-2003	Priority date (day/month/year) 21-06-2002	
International Patent Classification (IPC) or national classification and IPC H04R 1/46, A61B 7/04			
Applicant BANG & OLUFSEN MEDICOM A/S ET AL			

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 3 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☒ (sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

- This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 21-01-2004	Date of completion of this report 06-09-2004
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Anders Edlund /LR Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/DK2003/000427

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1 - 18 _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 19 - 20 received by this Authority on 22 - 07 - 2004

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1 - 7 _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/DK2003/000427

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-15</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-15</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1: US 5909495 A

D2: US 5492129 A

D3: US 6028942 A

D4: US 5467775 A

D5: US 5610987 A

The cited documents represent the general state of the art.
The invention defined in claims 1- 15 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed transducer for bioacoustic signals.

Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-15 is novel and is considered to involve an inventive step. The invention is industrially applicable.

PATENT CLAIMS

1. A transducer (T) for bioacoustic signals comprising a transducer element (1)
5 having a front side and a rear side, the front side of which may establish an intimate
contact with the surface of a body part, said surface being the transmitter of direct
interior sound from the body, said transducer element (1) being mounted in a housing
(3) subject to airborne noise, and having a surface (5) surrounding the front side of
10 said transducing element, said element and said surrounding surface being in
intimate contact with the surface of said body part during use,
characterised in that the effective area (ad) of the transducing element (1) is
less than 50% of the area (ah) of the surrounding surface (5) of the housing and in
that the rear side of the transducing element is loaded by acoustical network means
(7, 8) which are in communication with the surrounding air, said loading creating an
15 extinguishing relationship between airborne noise signals influencing the front and
rear sides of the transducing element respectively.

2. A transducer according to claim 1, characterised in that the effective
area (ad) of the transducing element (1) fulfills the area ratio $0,50 \geq ad/ah \geq 0,001$.
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3. A transducer according to claim 1, characterised in that the effective
area (ad) of the transducing element (1) fulfills the area ratio $0,20 \geq ad/ah \geq 0,05$.

4. A transducer according to claim 1 or 2, characterised in that the
25 transducing element (1) is a compound diaphragm giving an electrical output when
exposed to bending.

5. A transducer according to claim 1 or 2, characterised in that the
transducing element (1) is a compound diaphragm giving an electrical output when
30 exposed to differential stretching of the front side with respect to the rear side of the
diaphragm.

6. A transducing element according to claim 1 or 2, characterised in

7. A transducer according to claim 1, characterised in that the acoustical network consists of a cavity (7) and at least one port (8) in the housing.

5 8. A transducer according to claim 1, characterised in that the acoustical network consists of a cylindrical conduit having essentially the same diameter as the diaphragm.

9. A transducer according to claim 7, characterised in that the port is constituted by a narrow slit.

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10. A transducer according to claim 9, characterised in that the slit is made in a material that is not wetted by water.

11. A transducer according to claim 1, characterised in that an elastic
15 material (9) capable of transmitting mechanical vibration is provided in sealing relationship between the skin and the diaphragm.

12. A transducer according to claim 1, characterised in that the acoustical network means comprises damping material.

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13. A transducer according to claim 12 in view of claim 8, characterised in that the cylindrical conduit is provided with a damping material.

14. A transducer according to claim claim 12 in view of claim 7,
25 characterised in that damping material is used as a resistive element in a port (8).

15. A transducer according to claim 12, characterised in that the damping material has water-repellent qualities.

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